

CLAIMS

1. A multistep automatic transmission, with an input drive shaft (AN), an output drive shaft (AB), at least three individual planetary gearsets (RS1, RS2, RS3), as well as at least five shifting elements (A to E), whereby

- the three planetary gearsets (RS1, RS2, RS3) are placed to be coaxial with one another,

- the second and third planetary gearsets (RS2, RS3) are axially arranged beside one another,

- a sun gear (SO3) of the third planetary gearset (RS3) is affixed above the first shifting element on a transmission housing (GG) of the multistep automatic transmission,

- the input drive shaft (AN) is bound to a sun gear (SO2) of the second planetary gearset (RS2),

- the input drive shaft (AN) can be bound above the second shifting element (B) with a

- sun gear (SO1) of the first planetary gearset (RS1) and/or above the fifth shifting element (E) with a link (ST1) of the first planetary gearset (RS1),

- alternatively, the sun gear (SO1) of the first planetary gearset (RS1) can be affixed above the third shifting element (C) and/or the link (ST1) of the first planetary gearset (RS1) can be affixed above the fourth shifting element (D) on the transmission housing (GG)

and wherein

- either the output drive shaft (AB) and an internal gear (HO1) of the first planetary gearset (RS1) and a link (ST3) of the third planetary gearset (RS3) are bound with one another and a link (ST2) of the second planetary gearset (RS2) with an internal gear (HO3) of the third planetary gearset (RS3) is bound and the link (ST1) of the first planetary gearset (RS1) is bound to an internal gear (HO2) of the second planetary gearset (RS2) or

- the output drive shaft (AB) and the internal gear (HO1) of the first planetary gearset (RS1) and the link (ST2) of the second planetary gearset (RS2) are bound to one another and the link (ST3) of the third planetary gearset (RS3) is bound to

the internal gear (HO2) of the second planetary gearset (RS2) and the link (ST1) of the first planetary gearset (RS1) is bound to the internal gear (HO3) of the third planetary gearset (RS3),

therein characterized, in that the second and fifth shifting element(B, E), in regard to location, are placed axially between the first and the second planetary gearsets (RS1, RS2).

2. A multistep automatic transmission in accord with claim 1, therein characterized, in that the first planetary gearset (RS1) and/or the second planetary gearset (RS2) are centrally and completely held in turning, operational contact in the axial direction by only one shaft.

3. A multistep automatic transmission in accord with claim 2, therein characterized, in that the shaft, which penetratingly engages the first and the second planetary gearsets (RS1, RS2) in the axial direction is the input drive shaft (AN) of the automatic transmission.

4. A multistep automatic transmission in accord with claim 1, 2, or 3, therein characterized, in that lamella-packet (500) of the fifth shifting element (E), is designed of a greater diameter than is a lamella-packet (200) of the second shifting element (B).

5. A multistep automatic transmission in accord with one of the claims 1 to 4, therein characterized, in that the second and fifth shifting element (B, E) are combined as a constructive component, with:

- the lamella-packets (200, 500) of the second and fifth shifting elements (B, E),
- each servo apparatus (210, 510) of the second and the fifth shifting element (B, E) for the activation of the respective lamella-packet (200, 500) of the second, i.e., fifth shifting element (B, E), as well as
- a common lamella-carrier (ZYLBE) for the second and fifth shifting element (B, E) for the acceptance of the outer or inner coated lamellas of the lamella-packet (200, 500) of the second and fifth shifting element (B, E).

6. A multistep automatic transmission in accord with one of the claims 1 to 5, therein characterized in that a friction surfaced, inner diameter of coated lamellas of the lamella-packet (200) of the second shifting element (B) is smaller than a

friction surfaced, outer diameter of coated lamellas of the lamella-packet (500) of the fifth shifting element (E).

7. A multistep automatic transmission in accord with one of the claims 1 to 6, therein characterized in that the connecting agent between the link (ST1) of the first planetary gearset (RS1) and the internal gear (HO2) of the second planetary gearset (RS2) form in combination an outside lamella-carrier of the fifth shifting element.

8. A multistep automatic transmission in accord with claim 7, therein characterized in that the coated lamellas of the lamella-packet (500) exhibit on their outside diameter a complementary structural configuration, which, in a corresponding lamella contour of the outside lamella-carrier of the fifth shifting element (E) slidingly engage in an axial direction.

9. A multistep automatic transmission in accord with claim 7 or 8, therein characterized in that the common lamella-carrier (ZYLBE) for the second and fifth shifting element (B, E) forms a clutch space, within which, the lamella-packet (200) of the second shifting element (B) and the servo apparatus (210) of the second shifting element (B) are placed.

10. A multistep automatic transmission in accord with one of the claims 1 to 9, therein characterized in that the servo apparatus (510) of the fifth shifting element (E) and/or the servo apparatus (210) of the second shifting element (B) activate the lamella-packet (500, 200) respectively assigned thereto upon the closure of the fifth i.e., second shifting element (E, B) in axially in the direction of the first planetary gearset (RS1).

11. A multistep automatic transmission in accord with claim 10, therein characterized in that the servo apparatus (510) of the fifth shifting element (E) and/or the servo apparatus (210) of the second shifting element (B), as to location, is placed axially and between the respectively thereto associated lamella-packet (500, 200) and the second planetary gearset (RS2).

12. A multistep automatic transmission in accord with one of the claims 1 to 9, therein characterized, in that the servo apparatus (510) of the fifth shifting element (E) and/or the servo apparatus (210) of the second shifting element (B) activate the lamella-packet (500, 200) respectively assigned thereto, upon the

closure of the fifth, or the second shifting elements (E, B) axially in the direction of the second planetary gearset (RS2).

13. A multistep automatic transmission in accord with claim 12, therein characterized in that the servo apparatus (510) of the fifth shifting element (E) and/or the servo apparatus (210) of the second shifting element (B), from a location standpoint, is placed axially between the lamella-packet (500, 200), which has been respectfully thereto assigned, and the first planetary gearset (RS1).

14. A multistep automatic transmission in accord with one of the claims 1 to 13, therein characterized in that the servo apparatus (510) of the fifth shifting element (E) and/or the servo apparatus (210) of the second shifting element (B) possess a dynamic pressure compensation means.

15. A multistep automatic transmission in accord with one of the claims 1 to 14, therein characterized in that the servo apparatus (210) of the second shifting element (B) and/or the servo apparatus (510) of the fifth shifting element (E) is supported on that shaft which centrally penetrates the first planetary gearset (RS1), especially at the input drive shaft (AN).

16. A multistep automatic transmission in accord with one of the claims 1 to 14, therein characterized in that the servo apparatus (210) of the second shifting element (B) and/or the servo apparatus (510) of the fifth shifting element (E) is supported on the sun gear (SO1) of the first planetary gearset (RS1).

17. A multistep automatic transmission in accord with one of the claims 1 to 16, therein characterized in that the third and the fourth shifting element (C, D), as to location, are placed in an axial alignment in an area radially above the planetary gearset s (RS1, RS2, RS3).

18. A multistep automatic transmission in accord with claim 17, therein characterized in that the third and fourth shifting element (C, D) are placed next to one another, whereby special lamella-packets (300, 400) of the third and fourth shifting elements (C, D), these being at least of similar diameter, are placed.

19. A multistep automatic transmission in accord with claim 17 and 18, therein characterized in that the third and fourth shifting element (C, D) form a factory assembled group, which possesses the lamella packets (300, 400) of the third and fourth shifting elements (C, D) and a common outside lamella-carrier for

the third and fourth shifting element (C, D), whereby a servo apparatus (310) for the activation of the lamella-packet (300) of the third shifting element (C) and a servo apparatus (410) for the activation of the lamella-packet (400) of the fourth shifting element (D) at least partially integrated in this said outside lamella-carrier.

20. A multistep automatic transmission in accord with one of the claims 1 to 16, therein characterized in that the third shifting element (C), in regard to spatial location, is placed axially beside the first planetary gearset (RS1) on its side remote from the second planetary gearset (RS2) and that the fourth shifting element (D), as to location, is placed in an area radially over the planetary gearsets (RS1, RS2, RS3).

21. A multistep automatic transmission in accord with claim 17, 18 or 20, therein characterized in that an outer lamella-carrier of the third and/or fourth shifting elements (C, D) is integrated in the transmission housing (GG).

22. A multistep automatic transmission in accord with one of the claims 1 to 21, therein characterized in that the activation direction of the servo apparatus (310) of the third shifting element (C) and the activation direction of the servo apparatus (410) of the fourth shifting element (D) upon the energization of the respective shifting element (C, D) become opposed to one another.

23. A multistep automatic transmission in accord with one of the claims 1 to 21, therein characterized in that the activation direction of the servo apparatus (310) of the third shifting element (C) and the actuation direction of the servo apparatus (410) of the fourth shifting element (D), upon the energization of the respective shifting element (C, D) are in equal directions.

24. A multistep automatic transmission in accord with one of the claims 1 to 23, therein characterized in that at least one of the two servo apparatuses (310, 410) of the third and the fourth shifting elements (C, D) is placed axially between lamella-packets (300, 400) of the third and fourth shifting elements (C, D).

25. A multistep automatic transmission in accord with one of the claims 1 to 24, therein characterized in that the servo apparatus (310) of the third shifting element (C) and/or the servo apparatus (410) of the fourth shifting element (D) is at least partially integrated in the transmission housing (GG) or in a transmission

housing affixed housing wall (GW), which forms an outer wall of the transmission housing (GG).

26. A multistep automatic transmission in accord with one of the claims 1 to 25, therein characterized in that the first shifting element (A) as to location, is placed upon tat side of the third planetary gearset (RS3) which side is remote from the second planetary gearset (RS2).

27. A multistep automatic transmission in accord with claim 26, therein characterized in that the first shifting element (A) borders axially against the third planetary gearset (RS3).

28. A multistep automatic transmission in accord with one of the claims 1 to 27, therein characterized in that the first shifting element (A) borders on an outer wall of the transmission housing (GG) or on a transmission housing cover, which is rotatably-fast connected to the transmission housing (GG) and forms an outer wall of the automatic transmission.

29. A multistep automatic transmission in accord with one of the claims 1 to 25, therein characterized in that the first shifting element (A), as seen in the axial direction, is placed in an area radially above the planet gearsets (RS1, RS2, RS3), especially in a area, which, when seen in the axial direction, is radially above the third planetary gearset (RS3).

30. A multistep automatic transmission in accord with claim 29, therein characterized in that the first and fourth shifting element (A, D) are placed beside one another in axial alignment, whereby especially lamella-packet (100, 400) of the first and fourth shifting element (A, D) of an at least similar diameter are placed.

31. A multistep automatic transmission in accord with claim 29 or 30, therein characterized in that the first and fourth shifting elements (A, D) form a factory assembled construction component, which possesses the lamella-packets (100, 400) of the first and fourth shifting elements (A, D) and a common outer lamella-carrier for the first and fourth shifting element (A, D), whereby a servo apparatus (110) for the activation of the lamella-packet (100) of the first shifting element (A) and servo apparatus (410) of the forth shifting element (D) are at least partially integrated in this said common, outer lamella-carrier.

32. A multistep automatic transmission in accord with one of the claims 1 to 30, therein characterized in that an outer lamella-carrier of the first shifting element (A) is integrated within the transmission housing (GG) or in a housing partition-wall (GZ) which is turn-fast connected to the transmission housing (GG) or in a transmission housing affixed housing wall (GW) which forms an outer wall of the transmission housing (GG).

33. A multistep automatic transmission in accord with one of the claims 1 to 30 or 32, therein characterized in that the servo apparatus (110) of the first shifting element (A) is integrated in the transmission housing (GG) or in a housing partition-wall (GZ) which is turn-fast bound to the said transmission housing (GG) or in transmission affixed wall (GW), which forms an outer wall of the transmission housing (GG).

34. A multistep automatic transmission in accord with one of the claims 1 to 32, therein characterized in that the activation direction of the servo apparatus (110) of the first shifting element (A) and the activation direction of the servo apparatus (410) of the fourth shifting element (D), upon the energizing of the respective shifting element (A, D) become opposed to one another.

35. A multistep automatic transmission in accord with one of the claims 1 to 33, therein characterized, in that the activation direction of the servo apparatus (110) of the first shifting element (A) and the activation direction of the servo apparatus (410) of the fourth shifting element (D), upon the energizing of the respective shifting element (A, D) are equally directed.

36. A multistep automatic transmission in accord with one of the claims 1 to 35, therein characterized, in that at least one of the two servo apparatuses (110, 410) of the first and fourth shifting element (A, D) is placed axially between the lamella-packets (100, 400) of the first and fourth shifting elements (C, D).

37. A multistep automatic transmission in accord with one of the claims 1 to 36, therein characterized, in that the input drive shaft (AN) and the output shaft (AB) do not run co-axially with one another, especially the input drive shaft (AN) and the output drive shaft (AB) run axis-parallel or angularly to one another.

38. A multistep automatic transmission in accord with one of the claims 1 to 37, therein characterized, in that a spur gear stage (STST) or a chain drive is provided, by means of which the internal gear (HO1) of the first planetary gearset (RS1) and the internal gear (HO1) connected link (ST3, ST2) of the third or the second planetary gearset (RS2, RS3) is operationally bound to the output drive shaft (AB), whereby a first spur gear (STR1) of the spur gear stage (STST), or a first sprocket gear of the chain drive, is placed axially between the third planetary gearset (RS3) and the first shifting element (A).

39. A multistep automatic transmission in accord with claim 38, therein characterized, in that the first spur gear (STR1) of the spur gear stage (STST) on a housing partition-wall (GZ), which is placed axially between the spur gear stage (STST), i.e., chain drive and the third planetary gearset (RS3), whereby this housing partition-wall (GZ) is bound non-rotatably with the transmission housing (GG) or is built of one piece with the said transmission housing (GG).

40. A multistep automatic transmission in accord with claim 38, therein characterized, in that the first spur gear (STR1) of the spur gear stage (STST), or the first sprocket of the chain drive is supported on a housing partition-wall (GZ), which is located axially between spur gear stage (STST) or chain drive and the first shifting element (A), whereby this housing partition wall (GZ) is non-rotatably affixed with the transmission housing (GG) or is made as one piece with the aid transmission housing (GG).

41. A multistep automatic transmission in accord with claim 38, 39 or 40, therein characterized, in that the sun gear (SO3) of the third planetary gearset (RS3) or a sun shaft (SOW3) which is operationally connected with the sun gear (SO3) of the third planetary gearset (RS3) or a hub of the input element (120) of the first shifting element, which penetrates the housing partition (GZ) and the first spur gear (STR1) of the spur gear stage (STST), that is to say, centrally penetrates the first sprocket of the chain drive.

42. A multistep automatic transmission in accord with one of the claims 1 to 37, therein characterized, in that a spur gear stage (STST) or a chain drive is provided, by means of which the internal gear (HO1) of the first planetary gearset (RS1) and that with this internal gear (HO1) and the link (ST3, ST2)

bound with the said internal gear of the third or second planetary gearset (RS3, RS2) is operationally bound to the output drive shaft (AB), whereby a first spur gear (STR1) of the spur gear stage (STST), that is to say, a first chain sprocket of the chain drive on an outer wall of the transmission housing (GG) or borders a transmission affixed housing cover.

43. A multistep automatic transmission in accord with claim 42, therein characterized, in that the first spur gear (STR1) of the spur gear stage (STST), i.e., the first chain sprocket of the chain drive on the outer wall of the transmission housing (GG), that is, supported on the transmission housing affixed cover and/or on the input drive shaft (AN).

44. A multistep automatic transmission in accord with claim 42 or 43, therein characterized, in that the first shifting element (A), as to location, is placed between the third planetary gearset (RS3) and the first spur gear (STR1) of the spur gear stage (STST), that is to say, between the third planetary gearset (RS3) and the first chain sprocket of the chain drive.

45. A multistep automatic transmission in accord with claim 42 or 43, therein characterized, in that the first shifting element (A), as to position, is placed within a cylinder space, which is formed by the first chain sprocket of the chain drive, whereby the first shifting element (A) axially borders the third planetary gearset (RS3).

46. A multistep automatic transmission in accord with claim 45, therein characterized, in that a lamella-packet (100) of the first shifting element (A) borders axially on the third planetary gearset (RS3).

47. A multistep automatic transmission in accord with one of the claims 1 to 36, therein characterized, in that the input drive shaft (AN) and the output drive shaft (AB) run co-axially to one another.

48. A multistep automatic transmission in accord with claim 47, therein characterized, in that the output drive shaft (AB) which is operationally bound to the interior gear (HO1) of the first planetary gearshift (RS1) centrally penetrates the third planetary gearset (RS3) in an axial direction.

49. A multistep automatic transmission in accord with claim 47 or 48, therein characterized, in that the output drive shaft (AB) which is operationally bound to the

interior gear (HO1) of the first planetary gearset (RS1) centrally penetrates in an axial direction a clutch space of the first shifting element (A), which said space especially was formed by a lamella-carrier and/or the servo apparatus (110) of the first shifting element (A).

50. A multistep automatic transmission in accord with claim 47, 48 or 49, therein characterized, in that the input drive shaft (AN) is supported in the output shaft (AB).

51. A multistep automatic transmission in accord with one of the claims 1 to 50, therein characterized, in that by selective closure of the shifting elements (A to E) at least six forward gear stages can be so shifted, that for the change of shift, from one gear stage to another into the next successive higher or next successive lower gear stage relative to the present activated shifting element, respectively only one shifting element need be opened and another shifting element shut off.

52. A multistep automatic transmission in accord with one of the claims 1 to 51, therein characterized, in that in the first forward gear stage, the first and fourth shifting elements (A, D), in the second forward gear stage, the first and third shifting element (A, C), in the third forward gear stage, the first and the second shifting element (A, B), in the fourth forward gear stage, the first and fifth shifting element (A, E), in the fifth forward gear stage the second and fifth shift element (B, E), in the sixth forward gear, the third and fifth shifting element (C, E), and in a reverse gear. the second and fourth shifting element (B, D) are closed.